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Part IX

Environmental Protection Agency

Revised Motor Vehicle Exhaust Emission Standards for Carbon Monoxide (CO) for 1981 Model Year Light-Duty Vehicles and Decision Regarding Applications for Waiver of Effective Date

ENVIRONMENTAL PROTECTION AGENCY

Environmental Protection Agency

40 CFR Part 86

[FRL 1538–5]

Revised Motor Vehicle Exhaust Emission Standards for Carbon Monoxide (CO) for 1981 Model Year Light-Duty Vehicles

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This regulation establishes CO emission standards for 1981 model year light-duty vehicles belonging to certain engine families for which I have granted waivers from the standard otherwise applicable under section 202(b)(5) of the Clean Air Act, 42 U.S.C. § 7521(b)(5).

EFFECTIVE DATE: July 25, 1980.

FOR FURTHER INFORMATION CONTACT: Alex Varela, Manufacturers Operations Division (EN–340), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460, (202) 472–9413.

PUBLIC DOCKET: Information relevant to this rule is contained in Public Docket EN–80–9 at the Central Docket Section of the Environmental Protection Agency (EPA), Gallery I, 401 M Street, SW., Washington, D.C. 20460 and is available for review between the hours of 8:00 a.m. and 4:00 p.m. As provided in 40 CFR Part 2, a reasonable fee may be charged for copying services.

SUPPLEMENTARY INFORMATION: Section 202(b)(1)(A) of the Clean Air Act ("the Act"), 42 U.S.C. § 7521(b)(1)(A), requires that regulations applicable to CO emissions from light-duty vehicles or engines manufactured during or after the 1981 model year shall contain, unless waived pursuant to section 202(b)(5), 42 U.S.C. § 7521(b)(5), standards which require a reduction of at least 90 percent from CO emission levels allowable under the 1970 model year standards. Regulations implementing this requirement have established a CO standard, often referred to as the statutory standard for CO, of 3.4 grams per vehicle mile (gpm).

Section 202(b)(5) of the Act authorizes the Administrator, on application of any manufacturer, to waive the statutory CO standard for the 1981 and 1982 model years for any light-duty vehicle model for which the Administrator can make certain findings. In these cases, the Act requires that I promulgate substitute CO standards for 1981 and 1982 model year light-duty vehicles as discussed below. Applications for waivers considered here were submitted by General Motors Corporation (GM). The statutory criteria for the granting of such waivers, my determinations regarding the criteria with respect to the vehicle models covered by the waiver applications, and my decision to grant or deny the waiver applications, appear in the consolidated decision along with this rule and published elsewhere in this issue of the **Federal Register.** In that consolidated decision, I granted a waiver covering the following vehicle model (engine family for purposes of that decision) for the 1981 model year only:

Manufacturer	Engine family
General Motors Corporation....	1.6 liter/2 venturi.

Once I have decided to grant a waiver application for any 1981 model year vehicle model, the Act requires that I simultaneously promulgate regulations adopting emission standards not permitting CO emissions from 1981 model year vehicles of this GM model to exceed 7.0 gpm. Moreover, the Act further requires that I promulgate regulations establishing these standards no later than 60 days after I receive the waiver application in question. This rule becomes effective immediately upon publication to avoid the possibility of forcing General Motors to delay introducing this 1981 model year vehicle model into commerce because it must wait to receive certification of this model under a 7.0 gpm CO standard.

The public has been afforded an opportunity to comment on the waiver applications at issue, and I have considered those comments in making the consolidated decision which requires the promulgation of this amended rule. For these reasons, I find that providing notice and an opportunity to comment before final promulgation of any of the amendments contained in this rulemaking is impracticable and unnecessary.

Note.—The Environmental Protection Agency has determined that this document does not contain a major proposal requiring preparation of a regulatory analysis under Executive Orders 11821 and 12044 and OMB Circular A–107.

In addition, because the decision accompanying this rulemaking already is based on a detailed analysis indicating that this rulemaking will have a negligible effect on air quality, the Environmental Protection Agency has not prepared an Environmental Impact Statement to accompany this rulemaking as well.

Dated: July 15, 1980.

Douglas M. Costle,

Administrator.

40 CFR 86.081–8(a)(1) is revised to read as follows:

§ 86.081–8 Emissions standards for 1981 light-duty vehicles.

(a)(1) * * *

(i) * * *

(ii) Carbon monoxide—3.4 grams per vehicle mile (2.11 grams per vehicle kilometer), except that carbon monoxide emissions from light-duty vehicles of the following 1981 model year engine families shall not exceed 7.0 grams per vehicle mile (4.35 grams per vehicle kilometer):

Manufacturer	Engine family
American Motors Corporation.	151 CID.
	258 CID.
BL Cars, Ltd.	215 CID.
	326 CID.
Chrysler Corporation	1.7 liter.
	2.2 liter.
	2.6 liter.
	3.7 liter.
	5.2 liter/2V.
	5.2 liter/4V.
Ford Motor Company	1.3 liter.
	1.6 liter/2V overhead camshaft.
General Motors Corporation....	1.6 liter/2V.
	2.8 liter/173 CID–2V.
	3.8 liter/231 CID–2V.
	3.8 liter/231 CID–4V turbocharged.
Lotus Cars, Ltd.	2.0 liter.
Toyo Kogyo Co., Ltd.	91 CID.
	120 CID.
Toyota Motor Company, Ltd....	88.6 CID.

* * * * *

(Section 202 and 301(a) of the Clean Air Act, as amended, 42 U.S.C. § 7521 and § 7501(a))

[FR Doc. 80–22420 Filed 7–24–80; 8:45 am]

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ENVIRONMENTAL PROTECTION AGENCY

[FRL 1538-6]

Applications for Waiver of Effective Date of 1981 Model Year Carbon Monoxide Emission Standard for Light-Duty Motor Vehicles—Seventh Consolidated Decision of the Administrator

I. Introduction

This is the seventh consolidated decision I have issued under section 202(b)(5) of the Clean Air Act, as amended (Act), 42 U.S.C. 7521(b)(5), regarding applications from automobile manufacturers for waiver of the 3.4 grams per vehicle mile (gpm) carbon monoxide (CO) emission standard scheduled to apply to 1981 and 1982 model year light-duty motor vehicles and engines.[1]

As the introductions to the previous consolidated decisions explain, section 202(b)(1)(A) of the amended Act establishes a schedule for implementing standards applicable to CO emissions for 1977 and later model year light-duty motor vehicles and engines.[2] The 1977 amendments to the Act, however, included a new provision allowing the Administrator of the Environmental Protection Agency (EPA), under certain limited conditions, to delay for up to two model years implementation of the statutory 3.4 gpm CO standard scheduled to take effect for the 1981 model year.[3] However, these amendments require the Administrator to promulgate standards for vehicles granted waiver applications which do not permit CO emissions over 7.0 gpm.[4]

In response to waiver applications received prior to these under consideration, EPA held five sets of public hearings and issued six consolidated decisions pursuant to section 202(b)(5)(A).[5] In those decisions, I denied waivers for certain engine families either because I determined that effective control technology [6] was available contrary to the requirement of section 202(b)(5)(C)(iii) of the Act or because the applicant failed to provide sufficient information to establish that effective control technology was not available. Furthermore, the applicants failed to establish that considerations of costs, driveability, or fuel economy gave me a basis for reaching a different conclusion. I granted the wavier applications covering the remaining engine families after determining for each of those families that the requisite technology was not available, considering costs, driveability, and fuel economy, and that each application met all of the remaining statutory criteria for receiving a waiver.

Between March 31 and May 5, 1980, EPA received waiver applications from GM and Ford.[7] Specifically, Ford submitted a new application, while GM requested waivers for two engine families denied waivers in the first consolidated decision.[8] EPA held hearings on these pending applications on May 8, 1980.[9]

This decision will address the waiver requests from GM on the basis of previously offered and recently provided information from this manufacturer and from other sources.[10] I will announce my decision regarding Ford's waiver request in a separate opinion to be issued shortly.

II. Summary of Decision

I am granting GM's waiver request for its 1.6 liter (L)/2 venturi (V) engine family for only the 1981 model year. I am denying GM's waiver requests for the 1.6L engine family for the 1982 model year and for its 6.0L/modulated displacement (MD) engine family for the 1981 model year. As with previous waiver decisions, I have based my determinations primarily upon whether the applicant established that effective emissions control technology, considering costs, driveability and fuel economy, is not available to enable the engine family in question to meet the 3.4 gpm statutory CO standard for the model years covered b the waiver applications at issue.

I have concluded that the waiver application covering the GM 1.6L engine family meets each of the statutory criteria for receiving a waiver for the 1981 model year. I am therefore prescribing an interim CO emission standard of 7.0 gpm for the 1981 model year for this engine family.

GM failed to establish that effective emissions control technology is unavailable to enable vehicles scheduled to emply its 6.0/LMD engine family to meet the statutory CO standard for the 1981 model year. Instead, the information in the record at this time indicates that technology capable of meeting the 3.4 gpm CO emission standard is available for vehicles scheduled to use these engine families. In addition, the information in the record indicates that effective control technology is available for GM's 1.6L engine family for the 1982 model year.

Considerations of costs, driveability, or fuel economy, whether viewed separately or cumulatively, do not give me a basis for altering my determinations regarding the availability of technology for these engine families.

While these engine families may meet some, or all, of the remaining statutory

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[1] The preceding decisions were published as follows: 44 FR 53376 (September 13, 1979); 44 FR 69417 (December 3, 1979); 45 FR 7122 (January 31, 1980); 45 FR 17914 (March 19, 1980); 45 FR 37360 (June 2, 1980); 45 FR 40030 (June 12, 1980).

[2] Regulations were promulgated on August 24, 1978, setting a CO standard of 3.4 gpm for 1981 and later model year vehicles. 40 CFR 86.081-8(a)(1)(ii). This standard represents at least a 90 percent reduction in CO emissions from the CO standard applicable to 1970 model year vehicles.

[3] Section 202(b)(5)(C) of the Act provides, in part: The Administrator may grant such waiver if he finds that protection of the public health does not require attainment of such 90 percent reduction for carbon monoxide for the model years to which such waiver applies in the case of such vehicles and engines and if he determines that—

(i) such waiver is essential to the public interest or the public health and welfare of the United States;

(ii) all good faith efforts have been made to meet the standards established by this subsection;

(iii) the applicant has established that effective control technology, processes, operating methods, or other alternatives are not available or have not been available with respect to the model in question for a sufficient period of time to achieve compliance prior to the effective date of such standards, taking into consideration costs, driveability, and fuel economy; and

(iv) studies and investigations of the National Academy of Sciences conducted pursuant to subsection (c) and other information available to him has not indicated that technology, processes, or other alternatives are available (within the meaning of clause (iii)) to meet such standards.

[4] As noted in previous decisions, Section 202(b)(5) of the Act requires that I make a separate assessment for each vehicle model covered by a waiver request. See, e.g., 44 FR 53376 (September 13, 1979), 44 FR 69416 (December 3, 1979), 45 FR 7122 (January 31, 1980). Thus, these earlier consolidated decisions generally have included separate decisions for individual engine families. As in the previous decisions, I have distinguished among engine families primarily on the basis of engine displacement. See note 17, second consolidated decision, 44 FR 69416, 69418 (December 3, 1979).

[5] EPA has included testimony received at these five hearings, as well as all other information considered in deciding these five groups of waiver applications, in EPA Public Dockets EN-79-4, EN-79-17, EN-79-19 (for the third and fourth decisions) and NE-80-1 (for the fifth and sixth decisions, respectively).

[6] As was the case in the earlier consolidated decisions, I am using the term "technology" in this decision to encompass the statutory language "technology, processes, operating methods, and other alternatives" included as part of section 202(b)(5)(C)(iii) of the Act.

[7] Respectively, General Motors Corporation and Ford Motor Company.

[8] 44 FR 53376 (September 13, 1979).

[9] The transcript from this hearing is located in EPA Public Docket EN-80-9. This decision uses the following abbreviations: GM 1.6 Reapp.—GM Application for CO Waivers dated April 14, 1980 for its 1.6L engine family. GM 6.0 Reapp.—GM Application for CO Waivers dated March 31, 1980 for its 6.0L/MD engine family.

[10] See the discussion on my considerations of other sources of information in the previous waiver decisions, e.g., section III(B)(1)(C), 44 FR 69416, 69422 (December 3, 1979).

criteria for receiving waivers, my determinations regarding available technology, considering costs, driveability, and fuel economy, preclude me from granting waivers covering these engine families for the model years which I have specified. The 3.4 gpm CO statutory standard will therefore remain in effect for the GM 6.0L/MD engine family for the 1981 model year, and for the GM 1.6L engine family for the 1982 model year.

III. Discussion

A. *Availability of Technology.* The decisions I have made here on whether to grant or deny requested waivers turn primarily on whether technology is available to enable an engine family covered by one of these waiver applications to meet the 3.4 gpm CO standard in the 1981 and 1982 model years. Section 202(b)(5)(C)(iii) of the Act expressly assigns an applicant the task of establishing that effective CO control technology is not available, taking into consideration costs, driveability, and fuel economy. Even if the Administrator determines that an applicant has met this burden, section 202(b)(5)(C)(iv) requires the Administrator to consider whether National Academy of Sciences (NAS) studies or other information indicate that technology is available considering costs, driveability, and fuel economy, before granting a waiver request.

As was the case in the previous consolidated CO waiver decisions, this consolidated decision relies on information contained in the waiver applications and other information found in the public docket.[11]

Appendix A applies a "modified" Monte Carlo statistical simulation technique to extended mileage certification emission data from the applicants' certification "durability" vehicles. This "modified" Monte Carlo statistical simulation technique is similar to the "standard" Monte Carlo technique used here and in previous suspension and waiver decisions and identical to that used in my fifth and sixth consolidated decisions to project the likelihood that a given engine family will be capable of certifying to applicable emission standards.[12]

The "standard" Monte Carlo technique includes consideration of certain variabilities in projecting the likelihood of successful certification on the basis of emissions data for pre-production development vehicles.[13] Because data from actual certification test vehicles are now available for the 1981 model year engine families, certain terms which in previous decisions had been incorporated in the "standard" Monte Carlo simulation to account for variabilities in emissions performance are no longer relevant.[14] EPA has therefore modified the Monte Carlo simulation technique used in the first three consolidated CO decisions by eliminating those variabilities which are no longer applicable when evaluating actual certification data.[15]

As part of my assessment of technology, I have considered the results of NAS studies and investigations [16] conducted under section 202(c) of the Act regarding available technology, processes, or other alternatives. The findings of the available NAS studies do not contradict my assessment regarding the availability of technology for these engine families.[17]

To support contentions that effective control technology is not available, GM has provided both descriptions of the systems it has been considering in trying to attain the 3.4 gpm CO emission standard and the results of emission tests performed on vehicles for the purpose of receiving certification for the 1980 and 1981 model years. I have reviewed this information, as well as other information available to me, in reaching my decisions regarding availability of the requisite technology, considering cost, driveability and fuel economy.

GM requested reconsideration of my earlier decision denying its application for CO waivers for the 1.6L and 6.0L modulated displacement (MD) engine families for the 1981 and 1982 model years. I denied GM's previous waiver requests because I determined that GM failed to provide information sufficient to establish that effective technology was not available for the 6.0L/MD, and that, based on emission data from development vehicles provided on the 1.6L engine family, GM failed to establish that effective technology was not available for its 1.6L engine family.[18]

On March 31 and April 14, 1980, GM reapplied for waivers of the 3.4 gpm CO standard for, respectively, the 6.0L/MD engine family for the 1981 model year and the 1.6L engine family for the 1981 and 1982 model years. As part of its reapplications, GM submitted additional, newly available emission test data and further technical information. GM asserted generally that this information now establishes that technology is unavailable at this time to enable these engine families to meet a 3.4 gpm CO standard.

Specifically, GM stated that it is unable to incorporate emission control technology that would enable the 6.0L/MD engine family to meet the 3.4 gpm CO standard because of problems in controlling the air/fuel mixture and emissions control calibrations during transition stages when the engine is switching cylinder operating modes and because of catalyst deterioration.[19] GM also claims that it is unable to duplicate in EPA extended mileage certification testing the emission control performance capablity exhibited by earlier development vehicles of the 1.6L engine family.[20]

After reviewing the new information in GM's submission, I have determined that GM has established that effective emission control technology, considering costs, driveability, and fuel economy, is not available to enable its 1.6L engine family to meet the 3.4 gpm CO standard for the 1981 model year. However, I have also determined that effective emission control technology is available to enable the 6.0L/MD engine family to meet the 3.4 gpm CO emission standard in the 1981 model year and to enable the 1.6L engine family to meet that standard in the 1982 model year.[21]

1. *1.6L Engine Family.* I have determined that GM has established that effective emissions control technology is not yet available to enable it to produce vehicles using the 1.6L

[11] Much of this information was gathered for and included in the dockets for the previous consolidated CO waiver decisions. See EPA Public Dockets EN-79-4, EN-79-17, EN-79-19 and EN-80-1. Those dockets have been incorporated by reference into the docket for this seventh consolidated decision, EPA Public Docket EN-80-9.

[12] 45 FR 37360 (June 2, 1980). 45 FR 40030 (June 12, 1980).

[13] See, e.g., notes 21-23, 45 FR 37360 (June 2, 1980).

[14] App. A, Section III.

[15] See, e.g., 45 FR 37360, 37361-37362, 37365-37366 (June 2, 1980).

[16] Report by the Committee on Motor Vehicle Emissions of the National Academy of Sciences, dated November 1974, and Report by the National Research Council's CO Control Assessment Panel, dated June 1980. See also discussions of the applicability of NAS studies in previous CO waiver decisions, e.g., 44 FR at 53376, 53386 (September 13, 1979) and 44 FR at 69416, 69423 (December 3, 1979).

[17] See, e.g., 44 FR 53376, 53386 (September 13, 1979), 44 FR 69416, 69428 (December 3, 1979). I have had a limited opportunity to study the latest NAS report issued in June 1980. However, I find that the conclusions reached in this report give me no reason to alter my findings regarding the availability of technology as required under sections 202(b)(5)(C)(iii) and 202(b)(5)(C)(iv) of the Act. The report states that the requisite technology is available for much of the industry's planned production for the 1981 model year, but confirms that this might not be the case for all engine families. This conclusion is consistent with the determinations regarding available technology which I have reached in my waiver decisions to date and is consistent with the previous NAS report.

[18] 44 FR 53376 (September 13, 1979).

[19] GM 6.0 Reapp., section V.

[20] Id. See also May 8, 1980 Transcript, pp. 12-14. 44 FR 53376 (Septembe 13, 1979).

[21] App. A, sections V, IX.

engine family which are capable of meeting the 3.4 gpm CO emission standard for the 1981 model year.[22] GM has conducted durability certification testing on several prototype durability test vehicles, but none of those vehicles have demonstrated, through complete durability testing or according to the modified Monte Carlo analysis, that the technology which any of them uses can meet the 3.4 gpm CO standard.[23]

Certification Vehicle Number 1109, according to EPA's technical analysis, now represents GM's most promising emissions control technology currently undergoing certification testing for its 1.6L engine family. However, Appendix A's modified Monte Carlo analysis indicates that this configuration of the 1.6L engine family is not capable of certification at the 3.4 gpm CO standard.[24] I have also determined that GM does not have adequate lead time to develop and implement other technological alternatives for this engine family for the 1981 model year.[25]

My first consolidated decision [26] projected on the basis of emission data from precertification development vehicles that GM would be able to certify its 1.6L engine family under a 3.4 gpm CO standard and, therefore, that effective emission control technology would be available to enable this engine family to meet the 3.4 gpm CO standard. GM has demonstrated, however, that the precertification development vehicles evaluated in my first decision may not have fully represented the ability of this engine family to certify in time for the 1981 model year, because certification durability vehicles employing similar emissions control technology were unable to duplicate the emissions control performance of the previous development vehicles.[27]

However, information in the record indicates that GM coud incorporate effective emissions control technology in time to permit the engine family meet the 3.4 gpm CO standard for the 1982 model year.[28] The technical analysis identifies several possible technological alternatives which GM could consider employing by the 1982 model year.[29] I have therefore determined that GM has failed to establish that effective emission control technology is unavailable to enable its 1.6L engine family to meet the 3.4 gpm CO emission standard by the 1982 model year.

Considerations of costs, driveability or fuel economy give me no basis for altering this determination. GM did not raise fuel economy or driveability as issues. Although GM predicted a possible small additional cost in meeting a 3.4 gpm CO standard, GM has not substantiated that this cost increment will be so significant as to preclude GM from being able to market its 1.6L engine family in the 1982 model year.[30]

2. *6.0L/MD Engine Family.* The technical analysis in Appendix A also applies the Modified Monte Carlo analysis to certification durability emissions data from GM's 6.0L/MD engine family certification test vehicles. Although several of these earlier durability certification vehicles produced test results which failed to demonstrate ability to meet the 3.4 gpm CO emissions standard, modified Monte Carlo analysis of a more recent certification durability vehicle, vehicle 1614, indicates that the emission control technology represented by this vehicle is capable of meeting the 3.4 gpm CO emission standard.[31]

The 6.0L/MD certification vehicle which is likely to certify under a 3.4 gpm CO standard has not yet completed durability certification testing. The lead time and certification timing considerations associated with meeting GM's schedule for marketing the 6.0L/MD engine family, however, are different from those of the 1.6L engine family. Significantly prior to this decision, GM had already completed durability testing that would meet certification requirements under a 7.0 gpm CO emission standard for the 1.6L engine family and give GM the calibrations it deems it needs to order production components for producing vehicles under a 7.0 gpm CO standard.[32] However, GM had not completed durability testing of any 6.0L/MD system that would meet certification requirements under a 7.0 gpm CO emission standard significantly earlier than GM is likely to complete that testing for a system capable of meeting a 3.4 gpm standard.[33]

Specifically, certification durability test vehicle 1615, targeted to a 7.0 gpm CO standard, is scheduled to complete durability testing in time for GM's deadline for ordering what it deems to be a properly calibrated electronic control unit to permit introduction of its 1981 model year 6.0L/MD engine family as scheduled.[34] However, certification durability vehicle 1614, projected by the modified Monte Carlo to meet a 3.4 gpm CO emission standard, is scheduled to complete durability testing shortly after GM's scheduled completion date for certification durability testing on vehicle 1615 and GM's scheduled "release date" for calibrations for the electronic control unit.[35] The delay beyond these dates which GM would experience in ascertaining the precise calibrations which it deems it needs for ordering electronic control units for its production vehicles does not translate into a significant delay in GM's scheduled date for beginning to market this engine family under a 3.4 gpm CO standard. Therefore, GM has not established that its lead-time considerations would preclude the availability of effective emissions control technology to enable the 6.0L/MD engine family to meet the 3.4 gpm CO emission standard in the 1981 model year.

GM did not establish costs, driveability, or fuel economy as issues affecting the availability of technology

[22] App. A, section V.

[23] Although vehicle 1108 met the 3.4 gpm CO standard over extended mileage durability testing, the rate of deterioration in emissions control produced a "deterioration factor" which was too high to be practical for GM to employ in engineering and calibrating its production vehicles to meet Federal emission requirements. See 40 CFR § 86.079–28(a)(4) (explaning how to calculate and apply deterioration factors). Vehicle 1104 completed the 50,000 miles required for certification durability testing on June 3, 1980, at a CO emission level below 7.0 gpm. Therefore, GM has demonstrated that it does have technology available to meet a 7.0 gpm CO emission standard to enable it to market its 1981 production vehicles as scheduled.

[24] App. A, section V.

[25] App. A, sections V, IX.

[26] 44 FR 53376, 53383, 53395 (September 13, 1979).

[27] App. A, section V. Although GM contended the better emissions control performance of the 1.6L development vehicles was due to non-routine maintenance, the EPA technical staff rejected this explanation. Available evidence, however, supports the conclusion that GM has made a good faith effort to transfer the apparently effective technology used in development vehicles to its certification durability vehicles. See section III(D) of this decision.

[28] GM would not be likely to certify and incorporate any improved technology (such as the highly-loaded catalyst technology used in GM development vehicle Z–714A) into production vehicles until at least four months after the scheduled start of its 1981 model year production, because GM would have to complete EPA certification durability testing before it would have the information it believes it needs to develop and implement calibrations for its production vehicles. App. A, section IX.

[29] App. A, sections V, IX. See also section III(D) of this decision. In the case of a reapplication, an applicant could only establish that lead time precludes introduction of technology in the applicant's applicable model year where the applicant has also established its good faith efforts to develop and employ this technology.

[30] App. A, sections VI, VII, VIII. GM approximated the cost differences between vehicles targeted to meet the 3.4 gpm standard and those targeted to meet the 7.0 gpm standard at about $30–$40 a car. May 8, 1980 Transcript, p. 18. That cost difference may be somewhat higher if GM can meet the 3.4 gpm standard only by using more highly-loaded catalysts. App. A, section VI.

[31] App. A, section V.

[32] May 8, 1980 Transcript, pp. 19, 55. App. A, sections V, IX. See also, section III (A)(1)(b) of this decision.

[33] App. A, sections V, IX.

[34] App. A, sections V IX.

[35] App. A, sections V IX.

for this engine family because it did not demonstrate any differences between the 6.0L/MD system it would use to meet a 3.4 gpm standard compared to a configuration it would target to meet a 7.0 gpm standard.[36] I have determined, therefore, that considerations of cost, driveability and fuel economy do not give me a basis for altering my determination that GM has failed to establish that effective emissions control technology is unavailable to enable vehicles scheduled to use the 6.0L/MD engine family to meet the 3.4 gpm CO emission standard in the 1981 model year.

B. Protection of Public Health

Section 202(5)(C) of the Act requires that before I grant a waiver covering a given engine family, I must find that protection of the public health does not require attainment of a 3.4 gpm CO standard by the vehicles of the engine family receiving the waiver. Thus, I have examined this issue with respect to GM's 1.6L engine family for which I have determined that effective control technology, considering costs, driveability, and fuel economy, is not available in model year 1981. I have found as a result of this examination that any adverse health effects resulting from waiving the 3.4 standard for these 1981 model year engine families would be insignificant. The same statement is true regarding the combined health effects resulting from waiving the 3.4 standard for the 1981 model year for these engine families and for all the 1981 and 1982 model year engine families receiving waivers under the previous consolidated CO waiver decisions. As a result, protection of the public health does not require attainment of the 3.4 gpm CO standard for the GM 1.6L engine family, for which I have determined that effective control technology is not available for the 1981 model year.[37]

According to the express terms of the statute, there is no need for me to determine whether waiver applications covering engine families for which applicants failed to establish the unavailability of effective control technology (considering cost, driveability, and fuel economy) meet any of the remaining statutory criteria in order for me to deny these applications.[38] The Act requires me to deny waiver applications where an applicant has failed to meet any one of the criteria regardless of whether such applicant could meet the remaining criteria. Nevertheless, I will address these issues briefly in the course of discussing the remaining criteria in conjunction with those waiver applications as I did in the six previous waiver decisions.

While waiving the 1981 and 1982 statutory CO standards for any of the engine families here would not significantly affect the public health, noticeable increases in ambient CO levels could result from granting waivers industry-wide.[39] In light of the fact that industry-wide waivers would not be protective of the public health, it is reasonable to grant waivers covering only that portion of the industry consisting of those model year engine families for which I have determined that effective control technology, considering costs, driveability, and fuel economy, is not available (presuming these families also meet the remaining statutory criteria).[40]

C. Essential to the Public Interest or the Public Health and Welfare

Before I may grant a waiver request, section 202(b)(5)(C)(i) of the Act requires that I determine that granting the waiver is essential to the public interest or the public health and welfare.[41]

GM asserted that granting the waiver requests for its 1.6L engine family is essential to the public interest to ensure GM's ability to market these relatively fuel-efficient vehicles and to avoid severe economic and social costs which could result from the failure to market these vehicles if I denied GM's request.[42] I have determined that granting a one-year waiver to this engine family, for which I have determined that effective control technology is not available for GM's 1981 model year, is essential to the public interest. By granting this waiver, I will permit GM to market an engine family for which it otherwise would have faced a significant risk that it would not have been allowed to market. Granting waivers for this reason is essential to the public's interest in continuously maintaining a diversified and competitive automotive industry for the United States market.

I have determined that it is not essential to the public interest or to the public health and welfare to grant waivers to the GM 6.0L/MD engine family for the 1981 model year or to its 1.6L engine family for the 1982 model year because GM has failed to establish that the vehicles in question using either of these engine families are incapable of meeting a 3.4 gpm CO standard or are likely to incur significant costs (or driveability or fuel economy penalties) in meeting that standard for the model years in question. The public's interest in continuously maintaining a diversified and competitive automotive industry for the United States market is not adversely affected by my decision to deny waivers for engine families which manufacturers have adequate lead time to market without significant delay without waivers.[43]

GM also contended that it is in the public interest to allow it to market the specific technology (variable selection of operating cylinders) represented by the 6.0L/MD family. GM claims that marketing this engine family is essential to the public interest because the modulated displacement technology allows this engine to deliver the performance capabilities of a large engine while permitting some of the fuel economy characteristics of a smaller engine. GM stated that granting this waiver request would permit the additional accumulation of field experience with this technology if and when GM were to employ it in vehicles produced in the 1982 and following model years.[44] However, the Modified Monte Carlo analysis indicates that the GM 6.0L/MD engine family will be able to meet the 3.4 gpm CO emission standard, thereby enabling GM to certify and produce this engine family

[36] App. A, sections V, VII, VIII. The concerns which GM raised regarding the impact of the Federal gas guzzler tax on its ability to market this model if GM could not use the modulated displacement technology do not affect GM's ability to market this model with the modulated displacement technology. See, e.g. May 8, 1980 Transcript, pp. 83–85.

[37] See, e.g., discussion of ambient air quality effect, App. B, 44 FR 53376, 53402 534–7 (September 13, 1979) and 44 FR 69416, 69456–69462 (December 3, 1979). The engine families receiving waivers under my previous CO waiver decisions only constitute approximately 24% of the total projected 1981 model year light-duty vehicle sales in the United States.

[38] These remaining criteria are found in sections 202(b)(5)(C) of the Act. For discussion regarding these criteria in earlier waiver decisions, see, e.g., 44 FR 53378 (September 13, 1979); 44 FR 69416, 69420 (December 3, 1979); and 45 FR 7122, 7126 (January 31, 1980).

[39] GM has argued that granting a waiver to each of these engine families would have an insignificant impact on public health. For further discussion concerning these contentions, see the first decision, 44 FR 53376, 53381 and Appendix B at 44 FR 53402–53407 (September 13, 1979).

[40] See e.g. 44 FR 53376, 53382, 53386–53387 (September 13, 1980).

[41] See sections in previous decisions discussing public health and welfare effects of engine families denied waivers, 44 FR 53387, 44 FR 69429 (Sept. 13, 1979 and December 3, 1979).

[42] GM App., section II–A. May 8, 1980, Transcript, p. 21.

[43] GM has not substantiated any significant problems adversely affecting the public interest or the public health and welfare that would arise from a delay limited to several days in introducing its 6.0L/MD engine family which would alter my determination that granting a waiver for this engine family is not essential to the public interest.

[44] GM 6.0 Reapp., section III. May 8, 1980 Transcript, pp. 96–98. GM indicated that it has no current, definite plans to market vehicles with modulated displacement technology after the 1981 model year.

under the 3.4 gpm CO emission standard and gain the necessary field experience without a waiver.

D. *Good Faith*

In order for me to grant a waiver to any applicant, section 202(b)(5)(C)(ii) of the Act requires that I determine that the applicant in question has made all good faith efforts to meet the established emission standards. As a result, I have examined information regarding GM's previous and projected efforts toward meeting a 3.4 gpm CO emission standard for the engine families in question.

GM has submitted technical and other information to support the contention that it has acted in good faith in trying to meet the 3.4 gpm CO standard. In general, information in the record provides support for determining that GM has met the Act's good faith criterion in developing emission control technology to meet the 3.4 gpm CO standard.[45]

Because GM's certification vehicles failed to duplicate the emissions control capabilities demonstrated by GM's earlier development vehicles considered in my first consolidated decision, I considered GM's good faith development efforts to be crucial to its contentions regarding available technology. Had GM not made a good faith attempt to transfer apparently effective control technology represented by its earlier development vehicles to its initial certification vehicles [46] I could not have granted GM a waiver for this engine family.

In the absence of any evidence supporting a contrary conclusion, I am unable to determine other than that GM has met the good faith criterion with respect to the engine families under consideration in this decision.

E. *Risks in Determining Available Technology*

In *International Harvester Co. v. Ruckelshaus,*[47] the United States Court of Appeals for the District of Columbia Circuit reviewed the Administrator's decision to deny manufacturer's requests for a one-year suspension (from 1975 to 1976) of the effective date of the statutory hydrocarbon (HC) and CO standards mandated by the 1970 version of the Act. The Court stated, among other things, that the Administrator should have considered the risks associated with the possibility of erroneously granting those requests. The Court indicated that the Administrator should balance the economic costs (in terms of jobs and misallocated resources) or environmental costs possibly associated with an erroneous denial versus the possible environmental benefits lost through an erroneous grant.

I have considered explicitly the risks which denial of either waiver request poses to GM and to the public and have focused specifically on the risk arising from the possible slight delay in the scheduled 1981 model year marketing introduction of GM's 6.0L/MD engine family.[48] I have concluded that, although the impact on public health from granting either of these waivers for the model year in question may not be great, the severity of the adverse consequences which might arise from waiver denial would be slight.

Moreover, my findings that technology is available to enable an engine family to meet certification testing requirements are based on conservative projections.[49] The move from today's state of technology to the technology required to achieve the 3.4 gpm CO standard does not require any substantial shift to untried emission control methods. Furthermore, an incorrect determination here would have the potential to adversely affect the production of only one engine family, as opposed to the ability of the industry as a whole to produce cars for the public generally. In light of the minimal problems which these risks pose, and in light of Congress' expressed intent to afford a statutory waiver only in exceptional circumstances rather than on an across-the-board basis,[50] I have concluded that it is appropriate to deny waiver applications insofar as they cover engine families for which the manufacturer has failed to establish that effective control technology, considering costs, driveability, and fuel economy, is not available.

IV. Conclusion

The GM engine family for which I determined that effective CO control technology is not available for the 1981 model year is covered by a waiver application which meets each of the remaining criteria under section 202(b)(5)(C) of the Act. As a result, I am granting a waiver of the effective date of the 1981 statutory CO emission standard for the GM 1.6L engine family for the 1981 model year.

I have determined that for GM's 6.0L/MD engine family, effective control technology indeed is available to meet a 3.4 gpm CO standard by the 1981 model year, even after considering costs, driveability and fuel economy. For the GM 1.6L engine family, I have determined that GM has failed to establish that such technology, considering costs, driveability and fuel economy, is not available for this engine family in the 1982 model year. Thus, even though these waiver applications may meet one or more of the remaining criteria for receiving waivers, I nevertheless must deny the waiver applications covering the GM 6.0L/MD engine family for the 1981 model year and the GM 1.6L engine family for the 1982 model year.

V. Interim CO Exhaust Emission Standards

As required by section 202(b)(5)(A) of the Act, I am simultaneously promulgating regulations elsewhere in this issue of the **Federal Register** prescribing an interim CO emission standard of 7.0 gpm for 1981 model year vehicles for the engine family receiving a waiver. For this engine family, this action continues in effect for one additional year the CO emission standard applicable to all 1980 model year light-duty vehicles.

Dated: July 15, 1980.

Douglas M. Costle,

Administrator.

Appendix A—Summary of Technological Capability

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I. Introduction
II. Summary of Technological Capability

[45] In the case of GM's 1.6L engine family, good faith development could be a significant issue were GM to reapply for a waiver for 1982. Should GM reapply for a waiver for this engine family for the 1982 model year, I would consider closely the development work GM had performed regarding the technological improvements such as those indentified in Appendix A which GM could implement in the 1982 model year.

[46] Although there were some differences in catalyst loadings between some of the development vehicles and some of the certification durability vehicles, the certification durability vehicles generally represent the same technology as that employed by some successful development vehicles. See GM 1.6 Reapp., section IV. App. A, section V.

[47] 478 F. 2d 615 (D.C. Cir. 1973). For further discussion of this case, see the discussion in my first consolidated decision. 44 FR 53376, 53388 (September 13, 1979).

[48] See also my discussions in section III(A) and III(C) of this decision.

[49] See section III(A), supra. See also App. A, sections III, V. Although the Monte Carlo technique employed here differs slightly from that used in previous decisions, this "modified" Monte Carlo produces a more accurate projection of likelihood of successful certification while still maintaining conservative variabilities where necessary. See also, App. A, sections III, V.

[50] See also discussion of this issue in previous waiver decisions. 44 FR 53376, 53387 (September 13, 1979). 44 FR 69416, 69429 and 69430 (December 3, 1979). In my fourth consolidated decision I based my decision to grant waivers on the combined risks presented from two factors: (1) the severity of the adverse economic consequences which could occur as the result of an erroneous denial; and, (2) the likelihood that the denial, in fact, will turn out to be ill-founded. 45 FR 17914, 17917 (March 19, 1980). GM has not established that these factors contradict my findings here.

III. Statistical Treatment of the Data
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V. Discussion of Individual Manufacturers' Technical Capability
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VII. Driveability
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X. References

I. Introduction

The exhaust emission standards for 1981 and later model year light-duty vehicles are currently 0.14 gram per miles HC, 3.4 grams per mile CO, and 1.0 gram per mile NOx. Section 202(b)(5)(A) of the Clean Air Act, as amended, 42 U.S.C. 7521(b)(5)(A) provides the opportunity for manufacturers to request a waiver of the 3.4 grams per mile CO standard to 7.0 grams per mile during model years 1981 and 1982.

The applicant being considered in this document is General Motors. This is the fifth group of CO waiver applications that have been considered by EPA. This is the fourth time that a waiver request has been considered by EPA from General Motors.

This appendix deals with the technological capability of General Motors to meet the 1981 and 1982 CO standard of 3.4 grams per mile. This appendix relies on three previous technical appendixes, particularly for explanation of the basic concepts of the standard Monte Carlo simulation utilized in this analysis. These appendixes are:

1. Appendix B, Technical Appendix, to the decision of the Administrator on Remand for the United States Court of Appeals for the District of Columbia Circuit, April 11, 1973.

2. Appendix A, Technical Appendix, to the decision of the Administrator In re: Applications for Suspension of 1976 Motor Vehicle Exhaust Emission Standards, July 30, 1973.

3. Appendix A, Technical Appendix, to the decision of the Administrator In re: Applications for Suspension of 1977 Motor Vehicle Exhaust Emission Standards, March 5, 1975.

This appendix relies on reference 16 for discussion of the Modified Monte Carlo simulation used in this appendix. As indicated in Section 202(b)(5)(C) (iii) of the Clean Air Act, the technological feasibility determination is based on the consideration of technological capability, cost, driveability, and fuel economy. This appendix contains discussion of each of the above topics.

II. Summary of Technological Capability

Table II-1 summarizes the capability of the applicant manufacturer to meet the 1981 and 1982 emission standards. The standards considered in these tables are 0.41 HC, 3.4 CO, 1.0 NOx.

A guide to the summary tables is as follows. The first column lists engine displacement. The "as received" column refers to the emission data submitted by the manufacturer. "Improvements" refer to the projected technological improvements (factors) applied to the data submitted by the manufacturer.

The "no data" category is an abbreviated notation for the lack of acceptable data to perform EPA's established technological analysis as referred to in EPA's published CO waiver guidelines. The applicants have known for about six years what sort of data is necessary for EPA to make a determination under its established methodology whether or not a given vehicle would be projected to pass or fail a set of standards. Unfortunately, in some cases there was a lack of useable data for vehicles using specific engines. This effectively precluded EPA from making a pass/fail determination for those vehicles through the established methodology. In these cases the vehicles using these engines are called "no data" and no pass/fail determination was made.

Table II-1.—Applicant: General Motors

Engine	Pass as received?	Pass with improvement?
1.6L-2V	No for model year 1981	N/A [1].
	Yes for model year 1982	N/A [1].
5.0L-MD-TBI	Yes for model year 1981	N/A [1].

[1] N/A means not applicable or that no hardware improvement factors were applied to these vehicles.

III. Statistical Treatment of the Data

The standard Monte Carol methodology has been used for the analysis of prototype durability vehicles in this appendix. No changes have been made in the standard Monte Carlo methodology since its last use in a technical appendix. This methodology, which is the foundation for the Modified Monte Carol methodology for certification vehicles has been discussed in three previous technical appendixes:

1. Appendix B, Technical Appendix, to the Decision of the Administrator on Remand for the United States Court of Appeals for the District of Columbia Circuit, April 11, 1973.

2. Appendix A, Technical Appendix, to the Decision of the Administrator In re: Applications for Suspension of 1976 Motor Vehicle Exhaust Emission Standards, July 30, 1973.

3. Appendix A, Technical Appendix, to the Decision of the Administrator In re: Applications for Suspension of 1977 Motor Vehicle Exhaust Emission Standards, March 5, 1975.

A Modified Monte Carlo simulation has been developed and also utilized in this appendix for actual 1981 model year certification durability vehicles which have accumulated less than 50,000 miles of durability. The Modified Monte Carlo has been discussed in reference 18 as found in Section X of this document.

IV. Factors

With respect to the vehicle emission data submitted by the manufacturers for EPA analysis, vehicles are often run and tested over durability mileage accumulation schedules without using the best technology that is available to the manufacturer for certification in the 1981 or 1982 model years. There are many reasons why this occurs. First, such technology may have simply not been available in quantity when fleets of vehicles began mileage accumulation.

Second, all vehicles submitted for EPA staff analysis may not have been specifically designed for the 1981 and 1982 Federal emission standards. Also, the manufacturer may wish to maintain some technologies (with known durability) in reserve if their low mileage testing indicates that such technology may not be needed for compliance with the target emission standards. In addition, technology may not appear on durability vehicles because the manufacturer has made a decision that the technology would be too costly for production vehicles.

Factors which have previously been developed, but generally not used in the following analysis include factors for:

Warm up catalysts for 3W catalyst or 3W+OC systems,

Deletion of power enrichment,

Use of insulated or dual-walled exhaust pipes,

Use of exhaust port liners,

Use of throttle body fuel injection, and

Use of multiple point fuel injection.

Although the deletion of power enrichment was considered feasible for 1981, factors for this improvement were not used. Use of the other items was not considered possible for most manufacturers for most engine families before the 1982 model year. Therefore, through these additional techniques, the manufacturers may have some additional cushion for certification.

No factors were used for emission control system improvements for vehicles in this analysis. Some of the GM vehicles passed without factors so no additional emission control hardware was necessary for compliance with the emission standards. Developmental data were not provided by GM; therefore, no data was available for developing hardware improvement factors for 1982.

V. Discussion of Individual Manufacturers' Technical Capability

This section will discuss all vehicles which (1) were submitted by General Motors and (2) also are acceptable for input into either the standard Monte Carlo simulation or the Modified Monte Carlo analysis for certification vehicles. This section will also discuss 1981 model year certification vehicles which have completed the full 50,000 miles of mileage accumulation.

Details of the pass/fail determinations in section II are presented here. To pass the 1981 and 1982 emission standard of 0.41 HC, 3.4 CO, 1.0 NOx, the probabilities of passing each individual pollutant must be greater than or equal to 80% in either the standard or Modified Monte Carlo. If the probability of passing only HC, for example, is less than or equal to 79%, the vehicle is projected to fail—even if the probabilities of passing the CO and NOx standards greatly exceed the 80% cut point. For completed 1981 model year certification vehicles, pass/fail is determined by a comparison of their calculated 4,000 mile and 50,000 mile results to the standard.

General Motors (GM)

These are the fourth and fifth CO waiver applications that GM has submitted to EPA. Their previous waiver applications were for:

(1) All 1981 and 1982 model year vehicles,

(2) vehicles using 3.8 liter/231 CID turbocharged engines with four barrel, feedback carburetors, and

(3) vehicles using 4.9 liter/301 CID turbocharged engines with four barrel, feedback carburetors.

The applications discussed in this document are for vehicles using 1.6 liter/98 CID engines with feedback, two barrel carburetors and for vehicles using 6.0 liter/368 CID engines with feedback controlled throttle body fuel injection (TBI) and modulated displacement (MD). Modulated displacement means that under certain operating conditions, the eight cylinder engine has either two or four cylinders disabled. The disabling of cylinders is accomplished by blocking valve action by means of electrical solenoids.

GM requested a two year waiver (1981 and 1982) to 7.0 CO for the cars with 1.6 liter 2V engines, and they requested a one year waiver (1981 only) to 7.0 CO for vehicles with 6.0 liter-MD-TBI engines.

From previous applications, GM has received waivers for 1981 and 1982 to 7.0 CO for their vehicles using 2.8 liter/173 CID-2V engines and for vehicles using 3.8 liter/231 CID-2V engines. Also, they have received a waiver for 1981 only for their vehicles using 3.8 liter/231 CID turbocharged-4V engines.

In their current waiver applications, GM has submitted durability emission data from prototype and certification vehicles as shown in table V-1. All vehicles with 20,000 or more miles of durability were considered in the pass/fail analyses.

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Table V- 1

Vehicles in the General Motors Waiver Applications for the 1.6 Liter Engine and 6.0 Liter Modulated Displacement Engine

Engine	VIN	Emission Control System ****	Entered in Monte Carlo?	If Not Entered in Monte Carlo -Why?	Comment	References
6.0-MD-TBI	9207	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	Yes	—	1981 development vehicle	2 at 27, A-3, & A-10 4 at table 1 6 at table 1
6.0-MD-TBI	9238	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	Less than 20,000 miles of mileage accumulation	1981 development vehicle	2 at 27, A-3, & A-11 6 at table 1
6.0-MD-TBI	0213 1610***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	Yes	—	1981 certification vehicle	2 at 27, A-3, & A-5 4 at table 1 6 at table 1
6.0-MD-TBI	0214 1613***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	Yes	—	1981 certification vehicle	2 at 27, A-3, & A-6 4 at table 1 6 at table 1
6.0-MD-TBI	0223 1615***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	Yes	—	1981 certification vehicle	2 at 27, A-3, & A-7 4 at table 1
6.0-MD-TBI	0225 1612***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	Yes	—	1981 certification vehicle -now terminated	2 at 27, A-3, & A-8 4 at table 1 6 at table 1
6.0-MD-TBI	0226 1611***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	Less than 20,000 miles of mileage accumulation	1981 certification vehicle -now terminated	2 at 27, A-3, A-9 4 at table 1 6 at table 1
6.0-MD-TBI	0226R 1614***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	Yes	Less than 20,000 miles of of mileage accumulation	1981 certification vehicle -now terminated	2 at 27 4 at table 1 6 at table 1
6.0-TBI	9203	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	No waiver requested for this engine	Development vehicle	2 at 27, A-13, A-18 4 at table 1 6 at table 1

Table V-1(continued)

Engine	VIN	Emission Control System	Entered in Monte Carlo?	If Not Entered in Monte Carlo - Why?	Comment	Reference
6.0-TBI	9204	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	No waiver requested for this engine	Development vehicle	2 at 27, A-13 4 at table 1 6 at table 1
6.0-TBI	0212 1600***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	No waiver requested for this engine	1981 certification vehicle	2 at 27, A-13 4 at table 1 6 at table 1
6.0-TBI	0221 1601***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	No waiver requested for this engine	1981 certification vehicle	2 at 27, A-13 4 at table 1 6 at table 1
6.0-TBI	0222 1602***	FBTBI/AIR/BPEGR/ESA/EIS/3W/OC	No	No waiver requested for this engine	1981 certification vehicle	2 at 27, A-13 4 at table 1 6 at table 1
1.6-2V	1101	FBC/AIR/BPEGR/3W/OC	No	Less than 20,000 miles of mileage accumulation	1981 certification vehicle- now terminated	3 at A-3, A-5, A-6 & A-7
1.6-2V	1102	FBC/AIR/BPEGR/3W/OC	No	Has completed 50,000 miles	1981 certification vehicle	3 at A-3, A-9, A-10, & A-11
1.6-2V	1103	FBC/AIR/BPEGR/3W/OC	Yes	—	1981 certification vehicle- now terminated	3 at A-3, A-13, A-14, & A-15
1.6-2V	1105	FBC/AIR/BPEGR/ESA/EC/3W/OC	No	Less than 20,000 miles of mileage accumulation	1981 certification vehicle- now terminated	3 at A-3, A-17, A-18, & A-19
1.6-2V	1106	FBC/AIR/BPEGR/ESA/EC/3W/OC	Yes	—	1981 certification vehicle- now terminated	3 at A-3, A-21, A-22, & A-23
1.6-2V	1108	FBC/AIR/BPEGR/ESA/3W/OC	Yes	—	1981 certification vehicle	3 at A-3, A-25, A-26, & A-27 4 at table 2

Table V-1 (continued)

Engine	VIN	Emission Control System	Entered in Monte Carlo?	If Not Entered in Monte Carlo - Why?	Comment	Reference
1.6-2V	1109	FBC/AIR/BPEGR/ESA/EC/3W/OC	Yes	---	1981 certification vehicle	3 at A-3, A-29, A-30, & A-31 4 at table 2
1.6-2V	1110	FBC/AIR/BPEGR/ESA/3W/OC	Yes	---	1981 certification vehicle	3 at A-3, and A-33 5 at A-33 4 at table 2
1.6-2V	1111	FBC/AIR/BPEGR/ESA/3W/OC	No	Less than 20,000 miles of mileage accumulation	1981 certification vehicle	3 at A-3 and A-34 5 at A-34
1.6-2V	1113	FBC/AIR/BPEGR/ESA/EC/3W	No	" " "	1981 certification vehicle	3 at A-3 and A-35 5 at A-35
1.6-2V	1104	FBC/PAIR/BPEGR/3W*	No	Has completed 50,000 miles	1981 California certification vehicle	3 at A-3, A-37, A-38 & A-39
1.6-2V	1107	FBC/PAIR/BPEGR/3W*	No	Has completed 50,000 miles	1981 California certification vehicle	3 at A-3, A-41, A-42, & A-43
1.6-2V	1112	FBC/AIR/BPEGR/ESA/EC/3W/OC*	No	Less than 20,000 miles of mileage accumulation	1981 certification	3 atA-3, A-45
1.6-2V	Z-713	FBC/AIR/BPEGR/3W/OC*	No	Less than 20,000 miles of mileage accumulation	Development vehicle -now terminated	3 at A-47, A-49 A-50, & A-51
1.6-2V	Z-713A	FBC/AIR/BPEGR/3W/OC*	Yes	---	Development vehicle -completed 50K	3 at A-47, A-53, A-54, & A-55

Table V-1 (Continued)

Engine	VIN	Emission Control System	Entered in Monte Carlo?	If Not Entered in Monte Carlo - Why?	Comment	Reference
1.6-2V	Z-714	FBC/AIR/BPEGR/3W/OC*	Yes	---	Development vehicle -now terminated	3 at A-47, A-57, A-58, & A-59
1.6-2V	Z-714A	FBC/AIR/BPEGR/3W/OC*	Yes	---	Development vehicle -completed 50K	3 at A-47, A-61, A-62, & A-63
1.6-2V	Z-715	FBC/AIR/BPEGR/3W/OC*	No	Less than 20,000 miles of mileage accumulation	Development vehicle -now terminated	3 at A-47, A-65, A-66, & A-67
1.6-2V	Z-715A	FBC/AIR/BPEGR/3W/OC*	No	" " "	Development vehicle -now terminated	3 at A-47, A-69, A-70, & A-71
1.6-2V	Z-715B	FBC/AIR/BPEGR/3W/OC*	Yes	---	Development vehicle -now terminated	3 at A-47, A-73, A-74, & A-75
1.6-2V	Z-716	FBC/AIR/BPEGR/ESA/EIS/3W/OC	Yes	---	Development vehicle -completed 50K	3 at A-47, A-77, A-78, & A-79
1.6-2V	Z-717	FBC/AIR/BPEGR/3W/OC*	Yes	---	Development vehicle -now terminated	3 at A-47, A-81, A-82, & A-83
1.6-2V	7T263	FBC/BPEGR/3W**	Yes	---	Development vehicle	3 at A-47, A-85, A-86, & A-87
1.6-2V	Z-518	FBC/BPEGR/3W*	Yes	---	Development vehicle	3 at A-47, A-89, A-90, & A-91
1.6-2V	Z-519	FBC/BPEGR/3W*	Yes	---	Development vehicle	3 at A-47, A-93,

* First generation digital electronics.
** Analog electronics.
*** Two VINs are presented here. The first is the one used by GM in their waiver application. The second one is the certification VIN. The second number will be used in the following discussion of these vehicles.
**** FBCBI means feedback controlled throttle body injection.
AIR means switched air injection.
BPEGR means backpressure controlled exhaust gas recirculation.
PAIR means pulse or reed valve type air injection system.
ESA means electronic spark advance.
EIS means electronic idle speed control.
3W means 3-way catalyst.
OC means oxidation catalyst.

Pass/Fail Analysis of Vehicles Using 1.6 Liter Engines and 2V Carburetors

A total of seventeen vehicles are considered in this analysis. Nine of the vehicles are prototype durability vehicles and eight are 1981 model year certification vehicles. No hardware improvements have been considered for any of the vehicles.

A standard Monte Carlo analysis was performed on the nine prototype vehicles. The Monte Carlo results of these vehicles are shown in table V-2. Three of the vehicles (Z-518, Z-519, and 7T263) used pelleted 3-way only catalyst systems, and all three vehicles are projected to fail. This is not surprising as the first choice GM system for achieving 3.4 CO uses both a 3-way and an oxidation catalyst [1 at 7 to 8]. Three other vehicles (Z-714, Z-715B, and Z-717) used pelleted 3-way plus oxidation catalyst systems, and they all failed because the catalyst pellets were being lost out the tailpipe. Three vehicles (Z-713A, Z-714A, and Z-716) were run with monolithic 3-way plus oxidation catalyst systems, and all were projected to pass. GM has claimed that these last three vehicles were subject to excessive maintenance that would not be allowed in official EPA certification [1 at 12 to 13]. The EPA technical staff does not believe that it is likely that 1) these types of failures (high oil consumption, carburetor solenoid failures, and air switching valve failures) [1 at 13 to 14] [1 at 45] would occur in certification or 2) that emissions from these vehicles would be better than emissions from nominally identical vehicles which do not have such failures.

Actual emission results of the eight certification vehicles are shown in table V-3. Two of the vehicles (1103 and 1106) have been terminated due to poor emissions. Vehicle 1106 is much like the earlier vehicle Z-713A, which was projected to pass except that 1106 had electronic spark advance (ESA) and an E-cell (EC) in addition to the hardware on Z-713A. As indicated in table V-4, these two vehicles (1103 and 1106) are both projected to fail in the Modified Monte Carlo.

TABLE V- 2

Standard Monte Carlo Results of GM Development

Vehicles Using 1.6 Liter - 2V Engines

VIN	IW -	3W Catalyst Code*	OC Catalyst Code*	Probability of Pass HC	CO	NOx	Comments
Z - 518	2500	3256 (P)	--	88	0	97	Completed 50,000 miles
Z - 519	2500	3264 (P)	--	86	25	66	Completed 50,000 miles
Z - 713A	2500	3428 (M)	2961 (M)	92	95	97	Terminated at ~ 20,000 miles, catalyst loss
Z - 714	2500	3401 (P)	2931 (P)	2	38	99	Completed 50,000 miles
Z - 714A	2500	3451 (M)	2961 (M)	99	100	100	Terminated at ~ 30,000 miles, catalyst loss
Z - 715B	2500	3407 (P)	2934 (P)	86	40	97	Completed 50,000 miles
Z - 716	2500	3431 (M)	2963 (M)	95	87	100	Terminated at ~25,000 miles, catalyst loss
Z - 717	2500	3523 (P)	4086 (P)	0	0	97	
7T263	2250	3218 (P)	--	8	0	0	

* All catalyst code numbers are prefixed by the letters HN. This is a GM code number. Different code numbers indicate different catalysts. The suffixes (P) or (M) mean pelleted or monolithic catalysts.

Four certification vehicles (1102, 1104, 1107, and 1108) have completed the 50,000 miles of durability. Three failed the 1981 emission standards as previously shown in table V-3. Vehicle 1108 passes; however it has a deterioration factor for CO of 8.8. GM has stated that they could not produce vehicles using a df this high [1 at 22 to 26]. The technical staff agrees that a df this high may be less than fully desirable with respect to emission data vehicle calibration strategies. Two of the failing vehicles (1104 and 1107) are 1981 California certification vehicles which use 3-way only catalyst systems.

On the basis of prototype vehicles Z-713A, Z-714A, and Z-716, GM vehicles using 1.6 liter engines are projected to be able to certify to the 1982 emission standard of 0.41 HC, 3.4 CO, 1.0 NOx. Vehicle 714A is the vehicle, that EPA used as the basis to deny GM's initial waiver application. Vehicle 714A used a highly loaded catalyst which was not used on any GM certification vehicle. Since all current GM vehicles using the 1.6 L engine in the 1981 certification process are projected to fail, lead time constraints will not permit GM to recertify in time for the 1981 model year (see the lead time section of this document). The technical staff is not aware of any potential replacement engine for the 1.6 liter engine in the 1981 model year.

Table V- 3

Certification Emission Results of 1981 Model Year Vehicles

from General Motors Using 1.6 Liter - 2V Engines

VIN:	1102			1103*				1104***				1106*			
FAMILY:	11W2NN			11W2ND				11W2TNQZ				11W2NNN			
MILES	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX
4788.	0.121	2.19	0.42	4974.	0.101	1.07	0.55	5060.	0.152	2.42	0.59	4886.	0/121	2.50	0.63
10124.	0.122	2.15	0.57	10035.	0.115	1.67	0.73	9784.	0.189	3.43	0.51	9937.	0.146	2.51	0.86
14857.	0.152	2.83	0.68	14773.	0.159	1.85	0.90	15062.	0.216	3.41	0.47	14923.	0.167	2.72	0.84
20010.	0.137	2.29	0.70	19992.	0.163	1.72	0.82	20114.	0.297	4.89	0.44	19776.	0.205	4.64	0.84
25130.	0.212	3.64	0.69	25124.	0.201	2.79	0.79	24767.	0.333	6.38	0.38	4K(calc)**	0.11	1.98	0.69
30074.	0.192	2.38	0.78	30016.	0.205	2.42	0.86	29931.	0.272	4.78	0.52	50K(calc)**	0.37	8.08	1.26
30116.	0.206	2.79	0.78	30041.	0.166	1.84	1.03	29956.	0.276	4.28	0.52	df**	3.22	4.08	1.83
35029.	0.218	2.93	1.02	34764.	0.186	1.63	0.99	35065.	0.263.	4.73	0.49				
40134.	0.206	2.63	0.78	39858.	0.272	2.68	1.22	40131.	0.292	4.34	0.57				
44841.	0.226	3.80	1.00	44857.	0.265	2.87	1.45	45078.	0.283	5.06	0.59				
49893.	0.232	3.61	0.77	4K(calc)**	0.10	1.33	0.55	49778.	0.318	4.09	0.67				
4K(calc)	0.12	2.16	0.52	50K(calc)**	0.28	2.89	1.37	4K(calc)	0.19	3.46	0.46				
50K(calc)	0.24	3.48	0.95	df**	2.86	2.18	2.47	50K(calc)	0.33	5.15	0.58				
df	2.04	1.62	1.82					df	1.68	1.49	1.25				

*Terminated vehicle.

** Based on less than 50,000 mile durability

*** This is the system GM will sell if a waiver is granted

**** California vehicle

Table V-3 (cont)

VIN:	1107****			1108			1109*****			1110		
FAMILY:	11W2TPQZ			11W2NE			11W2NBM			11W2NG		
Miles	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX
5126.	0.154	3.58	0.15	4825.	0.292	0.81	0.42	5041.	0.112	1.10	0.50	5117.	0.134	2.07	0.53
10113.	0.180	4.21	0.17	9892.	0.313	1.17	0.53	10007.	0.120	1.97	0.52	9826.	0.152	0.67	0.70
14795.	0.178	4.31	0.18	14833.	0.260	1.01	0.49	14784.	0.125	1.59	0.61	14973.	0.205	1.31	0.64
19991.	0.179	4.34	0.23	19866.	0.316	1.22	0.62	19800.	0.147	2.31	0.67	19787.	0.172	1.11	0.77
24866.	0.183	4.17	0.24	24911.	0.147	1.19	0.36	24870.	0.156	2.61	0.59	25195.	0.166	1.03	0.74
30027.	0.157	4.35	0.34	30069.	0.168	1.70	0.39	29967.	0.152	2.41	0.67	4K(calc)**	0.15	1.39	0.37
30068.	0.145	2.79	0.33	30125.	0.176	1.41	0.36	30061.	0.164	1.94	0.60	50K(calc)**	0.22	0.12	1.01
34784.	0.173	3.90	0.29	34800.	0.256	2.55	0.49	35040.	0.179	3.09	0.61	df**	1.52	0.08	1.78
39784.	0.174	5.23	0.34	39923.	0.299	2.42	0.70	40072.	0.161	2.23	0.64				
45118.	0.198	4.67	0.36	44888.	0.400	2.96	0.67	4K(calc)**	0.11	1.29	0.52				
49780.	0.201	5.52	0.36	49782.	0.426	3.98	0.69	50K(calc)**	0.20	3.51	0.73				
4K(calc)	0.16	3.63	0.15	4K(calc)	0.23	0.37	0.41	df**	1.78	2.73	1.39				
50K(calc)	0.19	4.89	0.39	50K(calc)	0.32	3.26	0.63								
df	1.16	1.35	2.67	df	1.42	8.80	1.53								

*Terminated vehicle.

**Based on less than 50,000 mile durability

***This is the system GM will sell if a waiver is granted

****California vehicle

*****Uses alternative method of deterioration factor calculation

Table V-4

Modified Monte Carlo Results of 1981 GM

Certification Durability Vehicles Using 1.6 Liter -2V Engines

VIN	IW	Certification * Engine Family	3W Catalyst Code	OC Catalyst Code	Probability of Pass HC	CO	NOx	Comment
1103	2250	11W2ND	3485(M)	4089(M)	100	99	0	Terminated at ~ 45,000 miles
1106	2250	11W2NNM	3428(M)	2961(M)	68	0	2	Terminated at ~ 20,000 miles
1109	2500	11W2NBM	3431(M)	2963(M)	100	62	100	Active at 40,000 miles
1110	2500	11W2NG	3431(M)	2962(M)	100	100	70	Active at 25,000 miles

* All vehicles are in different certification engine families

Pass/Fail Analysis of Vehicles Using 6.0 Liter Modulated Displacement Engines and Throttle Body Fuel Injection

A total of six durability vehicles submitted by General Motors had sufficient mileage accumulation to be considered in this analysis. No hardware improvement factors were applied to any of the six vehicles. Five of the vehicles were 1981 model year certification vehicles and were analyzed by the Modified Monte Carlo technique for certification vehicles. One vehicle was a prototype vehicle and was analyzed using the standard Monte Carlo.

Emission results from the five certification vehicles are presented in Table V-5. This table indicates that only vehicles 1614 and 1615 will probably pass in certification at 0.41 HC, 7.0 CO, 1.0 NOx. The remaining vehicles (1610 and 1613) will likely fail either HC or NOx.

The Modified Monte Carlo results of the five durability vehicles are presented in table V-6. Four vehicles (1610, 1612, 1613 and 1615) are projected to fail the 0.41 HC, 3.4 CO, 1.0 NOx standards. Vehicle 1614 is projected to easily pass the same standard.

The standard Monte Carlo analysis was performed on the prototype vehicle 9207. The probabilities of passing for this vehicle are 0% for HC, 0% for CO, and 53% for NOx. All three probabilities are less than 80%, and therefore, the vehicle is projected to fail all three pollutants.

GM has also attempted to certify the 6.0 liter engine with throttle body injection* and without the modulated displacement feature as a backup engine for the 6.0 liter modulated displacement engine. If emission certification can be completed on the modulated displacement version, no vehicles will be sold without the modulated displacement feature [1 at 87 to 88].

* Also called DEFI or digital electronic fuel injection by General Motors in their waiver application.

Table V- 5

1981 Model Year Certification Durability Results of GM Vehicles Using 6.0 Liter Modulated Displacement Engines and Throttle Body Injection

VIN:	1610			1612*				1613				1614				1615			
FAMILY:	16T5ABB			16T5AEBY				16T5AGB				16T5AQB				16T5ARB			
MILES	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX	MILES	HC	CO	NOX
4937.	0.304	4.60	0.62	4838.	0.298	2.98	1.08	5027.	0.319	2.68	0.77	4787.	0.248	2.18	0.70	5083.	0.392	3.34	0.58
9909.	0.303	3.22	0.62	9911.	0.351	5.04	1.13	10000.	0.308	2.78	0.79	9995.	0.255	2.61	0.71	9776.	0.253	2.48	0.54
15041.	0.340	3.31	0.57	14880.	0.308	4.56	1.10	14887.	0.315	2.43	0.77	14998.	0.261	1.68	0.70	14860.	0.267	2.70	0.66
19825.	0.382	3.59	0.77	20144.	0.307	4.45	1.37	19979.	0.353	2.94	0.88	20127.	0.255	3.22	0.72	19987.	0.291	3.08	0.63
25060.	0.354	3.36	0.72	25122.	0.373	6.09	1.38	25056.	0.344	2.57	0.76	25095.	0.267	1.77	0.64	24780.	0.277	2.62	0.69
29903.	0.387	3.99	0.84	29961.	0.349	2.96	1.47	30074.	0.370	2.23	0.94	30032.	0.268	1.53	0.79	30028.	0.321	3.19	0.84
29934.	0.357	2.85	0.66	29992.	0.334	2.16	1.35	30110.	0.329	1.96	0.80	30099.	0.274	1.76	0.76	30071.	0.326	3.69	0.77
34830.	0.394	4.01	0.67	4K(calc)**	0.31	4.45	1.04	34860.	0.355	2.10	1.20	35028	0.264	2.13	0.67	34934.	0.331	3.13	0.72
39794.	0.360	3.61	0.89	50K(calc)**	0.38	3.20	1.72	40115.	0.350	1.77	1.22	4K(calc)**	0.25	2.43	0.70	4K(calc)**	0.31	2.80	0.54
45041.	0.497	6.82	0.75	df**	1.22	0.72	1.65	4K(calc)**	0.31	2.91	0.67	50K(cal)**	0.28	1.59	0.73	50K(cal)**	0.31	3.41	0.90
4k(calc)**	0.29	3.17	0.60					50K(calc)*	0.37	1.66	1.22					df**	1.01	1.22	1.66
50K(calc)**	0.45	4.81	0.84					df**	1.19	0.57	1.82	df**	1.12	0.65	1.04				
df**	1.54	1.52	1.39																

*Terminated vehicle

**Based on less than full 50,000 mile durability

Table V-6

Modified Monte Carlo Results of 1981 Certification
Vehicles Using 6.0 Liter Modulated Displacement
Engines with Throttle Body Injection

F	VIN	IW	Certification Engine Family	3W Catalyst Code*	OC Catalyst Code	Probability of Pass HC	CO	NOx	Comment
	1610	4500	16T5ABB	3407(P)	2934(P)	8	0	100	Active at 45K
	1612	4500	16T5AKNY	3639(P)	4062(P)	72	0	0	Terminated
	1613	4500	16T5ACB	3639(P)	4080(P)	85	100	0	Active at 40K
	1614	4500	16T5ADB	3407(P)	4079(P)	100	100	100	Active at 35K
	1615	4500	16T5ARB	3413(P)	2835(P)	98	53	100	Active at 35K

* the catalyst code is a GM designation. It is always prefixed by the letters HN. Different catalyst codes indicate different catalysts. The suffixes (P) mean that these are pelleted catalysts.

Two vehicles (1600 and 1601) without modulated displacement have completed certification durability testing. One (1601) has emission levels below the 1981 standard of 0.41 HC, 3.4 CO, 1.0 NOx. The emission results of the vehicles are shown in table V-7 .

In summary, GM vehicles using the 6.0 liter, modulated displacement engine with throttle body injection are projected to pass the 1981 emission standard of 0.41 HC, 3.4 CO, 1.0 NOx based on the 1981 certification vehicle 1614.

Table V- 7

1981 Model Year Certification Durability Results of GM Vehicles
Using 6.0 Liter Engines and Throttle Body Injection
(Without Modulated Displacement)

VIN:	1600			1601		
FAMILY:	16T5AB			16T5AD		
MILES	HC	CO	NOX	MILES	HC	CO	NOX
4798.	0.233	1.49	0.70	4873.	0.212	2.51	0.72
10141.	0.293	2.28	0.73	10014.	0.217	2.04	0.84
15091.	0.298	1.77	0.73	14777.	0.243	2.19	0.79
19873.	0.345	2.44	0.71	20122.	0.250	2.29	0.92
24779.	0.327	1.56	0.70	25177.	0.260	1.79	0.87
30036.	0.344	1.74	0.69	29794.	0.260	2.14	0.87
30160.	0.385	2.68	0.70	29848.	0.258	2.34	0.84
35015.	0.341	1.47	0.77	35115.	0.291	2.67	0.75
40054.	0.422	1.91	0.80	39779.	0.308	2.41	0.97
44996.	0.407	2.10	0.80	44849.	0.243	1.72	1.05
49781.	0.544	2.42	0.79	49799.	0.290	2.50	0.77
4K(calc)	0.24	1.82	0.69	4K(calc)	0.22	2.23	0.79
50K(calc)	0.47	2.14	0.79	50K(calc)	0.29	2.25	0.92
df	2.00	1.18	1.14	df	1.34	1.01	1.16

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VI. Cost Analysis

The costing methodology used here is essentially the same as that used in the six previous CO waiver decisions [9], [10 at 40030], [11 at 53400], [12 at 69450], [13 at 7133], [14 at 17915]. Responses to the EPA subpoena of August 8, 1979 enabled EPA to revise cost estimates of certain emission control devices, notably monolithic three-way and oxidation catalysts. The subpoena requested prices that suppliers charge the automobile manufacturers for emission control devices or systems.

Described below are estimates of cost to the consumer for compliance with 3.4 vs 7.0 CO (due to lead time problems for certain emission control devices, separate estimates are often necessary for 1981 and 1982). The changes in cost were calculated by individual engine size. These changes are based on the differences in emission control hardware between systems targeted to meet 7.0 CO, as described by the manufacturer in its applications and systems judged capable by EPA of meeting 3.4 CO, based on the Monte Carlo analysis results or successful certification of similar vehicles.

GM 1.6 Liter Engine

Three development vehicles (Z–713A, Z–714A, and Z–716) were projected by Monte Carlo analysis to pass a 3.4 CO standard. These vehicles all utilized GM's first choice emission control system. However, vehicle Z–714A was equipped with a catalyst which was more heavily loaded than any of the certification durability vehicles. GM stated the following when questioned at the public hearing about their choice of catalyst loading:

". . . we feel one of the things that catalyst loading affects is emission levels and is evidenced by the vehicle in question, Z–714A. The emissions level with this loading was very low and that coupled with the cost and availability of precious metal in the world supply made that not a good candidate catalyst for further testing."
[1 at 47].

The EPA technical staff believes that increased catalyst loadings may improve the emission performance of certification vehicles. Additionally, GM stated

"In hindsight, perhaps we should have selected a slightly higher catalyst loading . . ." [1 at 53].

GM stated that if the 1.6 liter engine received a CO waiver a less expensive emission control system would be certified [1 at 17]. A three way catalyst and pulse air system would be used in place of a dual-bed catalyst and air pump. GM gave a "ball park" estimate of the cost differential of this system change to be $30 to $40 [1 at 18].

The EPA estimates that GM's proposed 7.0 CO emission control system will cost $64 to $128 less than a system capable of meeting a 3.4 CO standard. The estimated cost includes the possible need to increase the catalyst loading of GM's first choice 3.4 CO system and the difference between the proposed 7.0 CO system versus the first choice 3.4 CO system.

GM 6.0 Liter Modulated Displacement Engine

The 6.0 liter modulated displacement engine is projected by the Monte Carlo analysis to pass a 3.4 g/mi CO standard based on data from vehicle number 1614. This projection was made without the addition of any emission improvement factors. GM did not indicate that any cost savings would be realized by certifying to a 7.0 g/mi CO standard versus a 3.4 g/mi CO standard. Therefore, the EPA technical staff estimates that no additional costs are required to meet the statutory standards with this engine.

Constraints, other than costs, may require substitution of the nonmodulated displacement engine for the modulated displacement engine. Deletion of the modulation feature will eliminate the need for the valve actuator devices. This will reduce the hardware costs per vehicle. However, GM projects that this possible engine substitution would substantially reduce vehicle sales and increase the likelihood of incurring a "gas guzzler" tax [5 at 17] [1 at 95].

VII. Driveability

The technological feasibility of meeting the 1981-1982 emission standards is, in part, determined by the applicant's ability to maintain acceptable driveability while attaining these standards.

General Motors—GM maintained that both the 1.6 liter engine and the 6.0 liter modulated displacement engine are incapable of meeting the 1981–1982 emissions standards. GM did not indicate that the waiver was requested because of an inability to maintain driveability at the 3.4 g/mile CO standard. No driveability data were submitted by GM. GM representatives stated at the public hearing that they cannot assess the effect on driveability of going from a 7.0 to a 3.4 g/mile CO standard because neither the 1.6 liter nor the 6.0 liter modulated displacement engine can achieve the 3.4 g/mi CO standard [1 at 84]. Therefore, based on available information, driveability is not an important factor in EPA's assessment of the ability of these GM engines to comply with a 3.4 g/mi CO standard.

VIII. Fuel Economy

General Motors 1.6 Liter Engine

GM stated at the public hearing that fuel economy of the 1.6 liter engine at a 3.4 versus 7.0 CO standard is not an issue with respect to this waiver request [1 at 83]. However, GM's sales weighted fuel economy would be reduced 0.329 miles per gallon if the 1.6 liter Chevette could not be produced and sold in model year 1981 [1 at 85]. This potential reduction, however, would not cause GM to incur any penalty for noncompliance with CAFE standards [1 at 85].

EPA concludes that the 1.6 liter engine is unlikely to incur a fuel economy penalty complying with a 3.4 CO standard in comparison to a 7.0 CO standard.

General Motors 6.0 Liter Modulated Displacement Engine

GM testimony indicates that for the 6.0 liter modulated displacement engine they do not anticipate a significant fuel economy penalty associated with meeting the statutory 3.4 g/mi CO standard versus a 7.0 g/mi CO standard [1 at 83]. A fuel economy penalty would be incurred if the non-modulated 6.0 liter engine had to be substituted for the modulated displacement 6.0 liter engine [1 at 83]. According to GM, this fuel economy penalty would create the potential of a "gas guzzler" tax being levied on Cadillac vehicles equipped with the non-modulated 6.0 liter engine [1 at 85]. Title II, Part I, Section 201 of the Energy Tax Act of 1978 (P.L. 95–618, 92 Stat. 3180) established the following schedule of taxes to be levied on the manufacturers of each 1981 year automobile which does not meet certain fuel economy targets:

If the fuel economy of the model type in which the automobile falls is:

The tax is:

At least 17	0
At least 16 but less than 17	$200
At least 15 but less than 16	350
At least 14 but less than 15	450
At least 13 but less than 14	550
Less than 13	650

Modulated displacement technology was credited by GM with the potential to increase fuel economy by seven per cent [2 at 12]. GM projected composite fuel economies for the modulated and non-modulated displacement 6.0 liter engines at 17.7 and 16.5 miles per gallon respectively [3 at 15]. However, at the public hearing, GM testified that these projected fuel economy numbers, "are not sophisticated at all" [1 at 9]. Development vehicle emission and fuel economy data submitted by GM do indicate an apparent fuel economy benefit from modulated displacement. However, these data do not conclusively show that either version of the 6.0 liter engine will be subject to a "gas guzzler" tax.

The EPA tested a prototype modulated displacement Cadillac for gaseous emissions and fuel economy. The test data indicated that for modulated displacement operation compared to continuous eight cylinder operation, the city fuel economy was equal and the highway fuel economy was increased approximately three per cent [16 at 10]. The average composite fuel economies for modulated versus non-modulated displacement operation were 14.5 mpg, and 14.2 mpg respectively. However, Cadillac Division personnel did emphasize that this was a prototype vehicle and that it had not been optimized for either fuel economy or emissions.

In summary, the fuel economy differential between 3.4 CO and 7.0 CO standards is not an issue for the 6.0 liter modulated displacement engine. Substitution of a non-modulated 6.0 liter engine may result in a reduction in fuel economy for those affected vehicles. This penalty does increase the likelihood that a "gas guzzler" tax may be levied on vehicles equipped with non-modulated displacement engines.

IX. Lead Time Considerations

GM 1.6 Liter Engine

Production of 1981 model year 1.6 liter engines cannot begin as scheduled at a CO standard of 3.4 g/mi. Successful completion of certification durability testing by vehicles presently running cannot be accomplished soon enough to satisfy start of production (SOP) lead time constraints [5 at 1] [1 at 19, 26].

Vehicle number 1104 has successfully completed durability testing for a 7.0 CO

standard. GM submitted PROM calibrations on June 3, 1980 which will permit a timely SOP at a 7.0 CO standard [7 at 1].

GM stated that two to three weeks would be required to finalize PROM calibrations following the completion of durability testing at 3.4 CO standard [7 at 1]. Both active vehicles (1109 and 1110) are projected to fail in the Modified Monte Carlo analysis, however, it is possible that one or both of the vehicles could still pass the 1981 emission standard of 0.41 HC, 3.4 CO, 1.0 NO_x. The failing probabilities in the Modified Monte Carlo analysis were 62 percent probability of pass for CO on vehicle 1109 and 70 percent for NO_x on vehicle 1110. If either vehicle 1109 or 1110 were to pass, a minimum of a five week delay in start of production would be encountered. A more likely estimate of the necessary delay in start of production would be about four months if new vehicles had to be run using catalysts like those on vehicle Z–714A. Additionally, GM stated that June 2, 1980 was the deadline to submit PROM calibrations to the electronics supplier [1 at 20].

Based on GM's estimated production rate of approximately 8,000 vehicles per week [7 at 2], this possible delay could result in a minimum production loss of 40,000 vehicles. GM representatives stated because the Chevette production rate is capacity limited, any production interruption could not be made up [1 at 30].

In addition to the technology currently being used to meet the statutory standard, several other areas are being developed to enhance the ability of the 1.6 liter Chevette to meet these standards. Development projects which will be available for the 1982 model year include; combustion chamber swirl ports, lower rolling resistance tires, improved air-fuel control algorithms and utilization of an AIR pump in conjuction with single-bed converter [5 at 4].

In summary, the 1.6 liter engine can begin production as originally scheduled by GM at a 7.0 CO standard, but not a 3.4 CO standard. Compliance with a 3.4 standard will delay SOP a minimum of five weeks and the resultant production loss may not be recouped. The 1.6 liter engine should be capable of meeting the statutory standard in model year 1982.

GM 6.0 Liter Modulated Displacement Engine

GM has not successfully completed durability testing for a CO standard of either 3.4 CO or 7.0 CO. Vehicle number 1614 is projected by the Monte Carlo analysis to pass a 3.4 CO standard without any factors and testing completion is scheduled for July 4, 1980 [8 at 5]. Vehicle number 1615 will likely pass a 7.0 CO standard and testing completion is scheduled for June 29, 1980 [8 at 5]. These vehicles represent GM's earliest opportunities to successfully complete durability testing.

The non-modulated displacement 6.0 liter engine has successfully completed durability testing at a 3.4 CO standard [1 at 88]. GM released a non-modulated PROM calibration to Delco on May 19, 1980 [7 at 1]. SOP could proceed as scheduled if the non-modulated displacement engine is used.

The inability of the modulated displacement 6.0 liter engine to meet the statutory standards was attributed to air-fuel ratio control problems when switching cylinders on and off [1 at 110, 111].

GM representatives were not aware of any GM production vehicles which would utilize modualted displacement technology in model year 1982 or beyond [1 at 98]. The lack of future modulated displacement applications leads the EPA technical staff to believe the level of effort expended on solving the control systems problem may have been somewhat limited.

The most demanding lead time constraint for this engine is the release of the PROM calibration to Delco Electronics. The latest possible release date which will allow a timely SOP is July 1, 1980 [1 at 103]. Considering the slight difference in the projected completion dates of the 3.4 CO and 7.0 CO durability vehicles, the EPA technical staff cannot foresee a significant lead time penalty associated with compliance with the statutory standards.

X. References

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2. *General Motors Application for waiver of 1981 Carbon Monoxide Emission Standard (6.0 Liter Modulated Displacement Engine Family),* March 1980.

3. *General Motors Application for Waiver of 1981 and 1982 Carbon Monoxide Emission Standard (1.6 Liter Engine Family),* April 1980.

4. Letter to Mr. Jeffrey G. Miller (EPA) from Mr. T. M. Fisher (GM) dated May 8, 1980.

5. Letter to Mr. Charles N. Freed (EPA) from Mr. T. M. Fisher (GM) dated May 19, 1980.

6. Letter to Mr. Charles N. Freed (EPA) from Mr. Marvin W. Jackson (GM) dated May 20, 1980.

7. Letter to Mr. Charles N. Freed (EPA) from Mr. M. Fisher (GM) dated June 16, 1980.

8. Letter to Mr. B. R. Patok (EPA) from R. C. Krueger (GM) dated June 9, 1980.

9. Leroy H. Lindgren, *Cost Estimations for Emission Control Related Component-Systems and Cost Methodology description* EPA Pub. No. 460/3–78–002, March 1978.

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The following agencies have agreed to publish all documents on two assigned days of the week (Monday/Thursday or Tuesday/Friday). This is a voluntary program. (See OFR NOTICE 41 FR 32914, August 6, 1976.)

Monday	Tuesday	Wednesday	Thursday	Friday
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DOT/FRA	USDA/REA		DOT/FRA	USDA/REA
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DOT/SLSDC	HHS/FDA		DOT/SLSDC	HHS/FDA
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Comments on this program are still invited. Comments should be submitted to the Day-of-the-Week Program Coordinator, Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D.C. 20408

REMINDERS

The "reminders" below identify documents that appeared in issues of the **Federal Register** 15 days or more ago. Inclusion or exclusion from this list has no legal significance.

Rules Going Into Effect Today

ACTION

39270 6–10–80 / VISTA Volunteer Grievance Procedure

List of Public Laws

Last Listing July 22, 1980

This is a continuing list of public bills from the current session of Congress which have become Federal laws. The text of laws is not published in the Federal Register but may be ordered in individual pamphlet form (referred to as "slip laws") from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (telephone 202–275–3030).

S. 2009 / Pub. L. 96–312 Central Idaho Wilderness Act of 1980. (July 23, 1980 94 Stat. 948) Price $1.

Just Released

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(Revised as of January 1, 1980)

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